Boron-doped diamond is a popular electrode material, which raise general interest due to their unique properties. It can be used for wastewater treatment, electrocatalysis or on electrochemical sensors. This is basically the only semiconductor material used as an electrode in electrochemical processes, which is due to the wide range of potentials in which decomposition of water does not occur.

Many of attractive properties of boron-doped diamond are related to type of surface termination bonds. Conversion of hydrogen to oxygen bonds significantly reduces charge transfer resistance of the electrode and increases chemical resistance of the material. Electrochemical oxidation, involving anodic polarization is the most widely used method of surface modification. By controlling this process one can also easily attach particles and films to the electrode, which is significant for biochemical applications.

Aim of the project is focused on understanding the mechanism of oxidation of termination bonds on diamond. This mechanism is not known, thus preventing from optimization of oxidation process of the electrode. Due to its polycrystalline structure, oxidation is heterogeneous, which can contribute diminishing of the electrode active surface and reduces the chemical resistance.